



NPS and DMNH photograph

Figure 1. Deployment by helicopter for paleontological inventory in Kenai Fjords National Park. Petrof Glacier in background.

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In 2003, we marked the fourth year of the Southwest Alaska Inventory and Monitoring Network paleontological inventory. Each field season provided many surprises including the discovery of a dinosaur trackway in Aniakchak National Monument and Preserve, previously undescribed floral assemblages in Katmai National Park and Preserve, and in 2003, the location and description of a shallow-water marine reef assemblage in Kenai Fjords National Park. *While clinging precariously to a narrow perch, high on a steep valley wall, overlooking Petrof Glacier, I was comforted by the secure feel of solid rock beneath my feet (Fiorillo, video excerpt).* Though these rock outcrops feel firmly rooted now, their presence in Kenai Fjords is the result of a journey that began in Central Asia approximately 280 million years ago. However, this is a story best told by the fossils contained within the rocks themselves.

Wandering Rocks in Kenai Fjords National Park

Last summer, the investigation of the paleontological resources of the national parks in the Alaska Region included Kenai Fjords National Park (*Figure 1*). Though most people associate the park with the vast Harding Icefield and the spectacular assemblage of glaciers flowing from the icefield, the park also contains a fascinating and unique paleontological story.

The rocks located through much of southcentral Alaska belong to the McHugh Complex, named for exposures along McHugh Creek just south of Anchorage. These rocks range in age from Permian (286-248 million years ago) to Cretaceous (145-65 million years ago). The McHugh complex is part of the larger Chugach Terrane and consists largely of metamor-



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Figure 2. McHugh Complex exposed near Exit Glacier. Note the alternating bands of sedimentary rock.



National Park Service (NPS) and Dallas Museum of Natural History (DMNH) photograph

Figure 3. Exposure of Permian limestone containing fossil fauna. Petrof Glacier in background.

phosed siltstones, sandstones, and conglomerates, as well as various igneous rocks. Igneous rocks form when molten rock cools and solidifies (crystallizes) (*Figure 3*). One additional minor component within the complex is limestone, a sedimentary rock consisting mainly of calcium carbonate (*Figure 4*). It is within these isolated blocks of limestone that the most interesting paleontological story of Kenai Fjords National Park is recorded.

Entombed in the twisted and churned limestone blocks is a diverse suite of fossils. Some, called fusulinids, are very large one-celled animals shaped roughly like grains of wheat (*Figure 4*). Calvin Stevens of San Jose State University and colleagues reported 12 different fusulinids from this limestone. They also mentioned several types of single-celled organisms called foraminifera, and one alga. Dwight Bradley of the U.S. Geological Survey, Alaska and colleagues identified conodonts, tiny jaw-like structures the size of a grain of sand.

The most common fossil that we found was a generally flat, platy animal, which occurred in layers within the limestone matrix (*Figure 5*). Though at this point in the study it is not possible to rule out bryozoans, a primitive colonial animal, the animals we found may be related to sponges. There are other animals that occur in layers and are closely related to sponges. These sponge-like animals are abundant throughout much of the limestone outcrops.

In much lesser abundance were broken remains of crinoids, lily-like marine animals that blanketed floors of ancient shallow seas. There were also very rare occurrences of broken mollusk shells. Together, these

animals represent a type of ancient reef complex, one that was present in a warm, shallow, tropical ocean. An additional surprise contained in the fossil reef complex was the presence of a highly altered hydrocarbon, presumably naturally occurring oil residue (Figure 5).

A preliminary analysis suggests the ancient assemblage of organisms is Permian in age and formed a thriving reef community that lived long before any dinosaurs walked the earth. The type of animals found in the rocks of Kenai Fjords National Park are most like those found in similarly aged rocks in Asia rather than any in northwestern North America. Given this, it appears that this small slice of Alaska was indeed mobile (Figure 6) and wandered from Asia, an unsettling thought when one is clinging to such rocks believed to be deeply rooted in the mountainous terrain of Kenai Fjords.



Figure 4. Close up of limestone showing remains of fusulinids in cross-section. They are the circular outlines on the dark gray limestone.



Figure 5. Close up of Permian limestone showing the platy fossils tentatively identified as the remains of sponge-like animals. The dark material is the highly altered hydrocarbon residue.



Figure 6. Small, isolated block of limestone, approximately the size of a basketball. This rock was torn off the main limestone boulder and incorporated into the surrounding rock as this section of Alaska moved from Asia to its current position.

REFERENCES

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